WHAT IS CLAIMED IS:

1. A method of cleaning a generator or turbine components using a laser beam, the method comprising:

programming a controller coupled to a laser source for controlling the laser source to perform laser ablation; and

directing a laser beam at a generator or turbine component surface for vaporizing surface contaminants and coatings deposited on said generator or turbine component surface without changing base material properties of said generator or turbine components.

2. The method of claim 1, further comprising:

coupling the controller to a computer system having a processor and a database;

loading the database with turbine or generator component data and corresponding laser power related data for ablating surface contaminants and coatings from the generator or turbine components;

providing a detector to monitor ablation process and provide feedback data to the computer system;

comparing the feedback data with predetermined data to determine progress of ablation; and

controlling the laser source depending on the comparison step.

3. The method as in claim 1, further comprising:

disposing vapors generated during laser ablation.

4. A laser based system for removing contaminants deposited on a machine component surface, comprising:

a laser source; and

a controller for controlling the laser source, said controller causing the laser to emit a laser beam such that the contaminants deposited on the machine component surface are ablated without changing base material properties of the machine component.

5. The system as in claim 4, wherein the controller is programmed to control the laser source.

6. The system as in claim 4, further comprising:

a computer system coupled to the controller; and

a detector disposed adjacent the generator or turbine component to monitor the progress of laser ablation using the laser beam from the laser source, the detector providing the monitored data to the computer system for causing the controller to vary the power of the laser beam from the laser source.

7. The system as in claim 6, where the computer system comprises:

a processor having a comparator; and

a database for storing turbine or generator component data, and respective laser power related data for causing laser ablation of surface contaminants and coatings of the turbine or generator components.

8. A laser-based system for cleaning a generator or turbine component, comprising:

a controller coupled to a laser source for controlling the laser source to perform laser ablation;

means for directing a laser beam at a generator or turbine component surface for vaporizing surface contaminants and coatings deposited on said generator or turbine component surface without changing base material properties of said generator or turbine components;

a computer system having a processor and a database, the computer system communicatively coupled to the controller, and wherein the database is loaded with turbine or generator component data and corresponding laser power related data for ablating surface contaminants and coatings from the turbine or generator components;

a detector disposed adjacent to the turbine or generator component to monitor ablation process and provide feedback data to the computer system;

a comparator for comparing the feedback data with predetermined data to determine progress of ablation; and

means for controlling the laser source depending on the comparison step.

9.   A laser-based method for cleaning a machine component, the method comprising:

controlling a laser source to modulate a laser beam for performing laser ablation;

directing the laser beam towards a component surface for vaporizing surface contaminants and coatings deposited on the component surface without changing base material properties of the component;

communicatively coupling a computer system having a processor and a database to the controller;

loading the database with data related to the component and corresponding laser power related data for ablating contaminants and coatings from respective components;

monitoring ablation process of the component using a detector, the detector being disposed adjacent to the component;

receiving feedback data from the detector at the computer system;

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comparing the feedback data with predetermined data in a comparator to determine progress of ablation; and

controlling the laser source depending on the comparison step.

10. An apparatus for cleaning a generator or turbine components using a laser beam, comprising:

means for controlling a laser source to perform laser ablation; and

means for directing a laser beam at a generator or turbine component surface for vaporizing surface contaminants and coatings deposited on said generator or turbine component surface without changing base material properties of said generator or turbine components.

11. The apparatus as in claim 10, further comprising:

a controller communicatively coupled to a computer system having a processor and a database;

means for loading the database with turbine or generator component data and corresponding laser power related data for ablating surface contaminants and coatings from the generator or turbine components;

means for monitoring ablation process and providing feedback data to the computer system;

means for comparing the feedback data with predetermined data to determine progress of ablation; and

means for controlling the laser source depending on the comparison step.

12. The apparatus as in claim 10, further comprising:

means for disposing vapors generated during laser ablation.